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An

Inaugural Dissertation

on the

Influence of certain causes on the
decarbonating function of the Lungs –

C. E. Pearson
N. Jersey 1813

On certain causes which influence the decarbonating functions of the Lungs. ——

In the various departments of Natural knowledge the influence of the late rapid advancement in Chemical Science has been extensively felt; and this influence has by no means been withheld from the physiology of the Animal body. It has shed light on the functions of several of the Organs in the human economy, but on no one so much as that of the Lungs — Since the successful investigation of the Nature of our atmosphere, our knowledge of the uses of respiration has advanced apace. And the present highly perfected state of this knowledge proves, how important and curious the subject has been considered, and with what assiduity it has been pursued. Without giving an entire history of the progress of investigation in this branch of physiology, I shall briefly state what is the Amount of our present information respecting it, and then proceed to apply it to the purposes of this Essay —

The latest experiments on this subject are those of Allen & Pepys — the result of their labours is the establishment of the following conclusions —

1st. The inspired Air imparts none of its Oxygene, nor Nitrogene to the blood —

2d. The blood loses a principle viz. carbone, which by its union with the Oxygene of the inhaled Air, forms carbonic Acid gas —

3d. The watery vapour found in the expired Air, is the serous discharge from the surface of the bronchial tubes —

4th. The Blood derives heat from the decomposition of the inspired Air, all the latent heat of the Oxygene gas not being necessary to —

the formation of the carbonic Acid gas.—

The dark colour of the venous blood, is owing to its being surcharged with carbone; and the bright scarlet colour of the arterial blood, to its parting with carbone in the process of breathing.—

The experiments of those Gentlemen have been conducted on a much larger scale, and with more vigilant endeavours to fortify against all sources of error, than those of their predecessors; and they had a more improved state of chemistry to aid them in their labours.

Their conclusions as to the products of Respiration, are not widely different from those of Crawford Lavoisier & Davy. For the most prominent circumstance of respiration was considered by the latter Chemists, to be the separation of carbone from the blood. But as to the quantity of Oxygene consumed, the place of its union with the carbone, and the source of the aqueous vapour, there is a greater disagreement.

It would then appear, that the principal design of Respiration is to separate from the blood a Matter, which if retained in any considerable quantity, is extremely deleterious to life; but which in a certain limited quantity is harmless. Carbone enters largely into the blood as a part of the Chyle; and but a small portion of it seems to be expended in the process of Nutrition and Secretion. The design of this surplus perhaps is, to promote the conversion of Chyle into perfect animalized blood; and to assist in effecting those decompositions and new combinations which occur in Nutrition and Secretion. Having answered the above purpose it is conveyed out

of the System chiefly through the lungs. Carbone is then an excretion, a term which was first applied to it by Professor Coxe of this University. He considers its separation from the blood not as a secondary circumstance, and one, Merely instrumental to the production of Animal Heat; but as a process primarily and in itself essential to the healthy condition of the Animal Machine.

Having given this preparatory sketch of what occurs in Respiration, I proceed to state a conjecture, which I shall endeavour to support in the subsequent part of this Essay: Viz. That there are certain circumstances affecting Respiration, which subject the human System to such a retention of the Carbone of the blood, as to be morbid, and cause derangement and disease. I am not to be considered as speaking of those sudden, and absolute interruptions of the Functions of the lungs, which constitute asphyxia and suffocation; but such as are not the effect of Accident, and arise from causes which are gradual and extensive in their operation. There are obviously 3. circumstances on which must depend the more or less perfect decarbonation of the blood. The Velocity of the Circulation of the blood; the State of the atmosphere breathed; and the freedom with which the air is admitted to the extreme pulmonary vessels. According to this general division will be arranged the few facts and arguments, by which I shall attempt to defend the above position.

But of those causes which influence the Circulation, I propose to confine myself to One. Viz. Exercise.—

of the lungs to execute the due quantity of [illegible]

[illegible]

That [illegible] health [illegible]

[illegible] muscles; as [illegible]

of body are [illegible]

But [illegible]

does not require a total Or[illegible]

the blood below its mouth the Ra[illegible]

[illegible]

the Head of[illegible]

[illegible]

No

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

a long train of affections, whi[illegible]

[illegible] of life, and which though often s[illegible]

[illegible] debility, and relaxation[illegible]

[illegible]

[illegible] low complexion of th[illegible]

[illegible] low spirits, [illegible] tation, and loss of natural

[illegible] tion, and Obesity &c.

[illegible] who are exposed from the above causes, are liable to a variety of eruptions which are solely owing to being for a long time exposed [illegible] [illegible].

[illegible] [illegible] obesity [illegible] with the [illegible] [illegible] a [illegible] of [illegible] . [illegible] frequently in [illegible] [illegible] [illegible] [illegible] [illegible] of a [illegible] [illegible] suddenly a[illegible] [illegible] an accretion of fat, [illegible] [illegible] entirely [illegible] the appearance. [illegible] [illegible] in every part of the body, but the [illegible] is especially [illegible] the [illegible] [illegible] exceeding [illegible] is usually [illegible] a [illegible] [illegible]. [illegible] called this overgrowth of fat a disorder and [illegible] [illegible] of fibrous or fleshy parts of the body [illegible] [illegible] [illegible] [illegible]. The fat is [illegible] [illegible] [illegible] [illegible] [illegible], [illegible] [illegible] [illegible] deposition of [illegible] [illegible] which the [illegible] [illegible] [illegible] [illegible] to [illegible] [illegible] [illegible] [illegible] [illegible] of [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] tissues, [illegible] [illegible] the [illegible] [illegible] [illegible] [illegible] [illegible] be [illegible] [illegible] [illegible] [illegible] [illegible]. [illegible]

[illegible] of the [illegible] that they are of advance, to [illegible] out [illegible]

[illegible] will not admit of my being particular on this

[illegible] tion of the respe

[illegible]

[illegible] owing to [illegible]

too little exercise [illegible]

common to see [illegible]

[illegible].

But in what manner this is caused by a redundancy of c-

[illegible] in the blood, [illegible] appear in the [illegible]

of the subject. Habitual exercise [illegible] any other [illegible]

[illegible] bilious affections [illegible].

[illegible] on the [illegible]

of Circulating Carbon[illegible]

[illegible] State of the Air we breathe may dep[illegible] either [illegible] or in a diminution of Weight in the Atm[illegible] [illegible] observe a corresponding diminution [illegible]

1st [illegible] on Heat [illegible]

[illegible] Lavoisier [illegible] Oxygen [illegible] by [illegible] temperature [illegible] 14 [illegible] Oxygen [illegible] temperature of 134 [illegible] to the Oxygen [illegible] by elevating the temp[illegible] 14° to [illegible]°

[illegible] [illegible] carbon, [illegible], [illegible] 134 cubic inches [illegible]
[illegible] [illegible] [illegible] [illegible] [illegible] the [illegible]
[illegible] in the Amount of [illegible] carbon [illegible] [illegible] of [illegible]
[illegible], it [illegible] [illegible] be [illegible] the [illegible] does not [illegible]

[illegible]. Dr Crawford, [illegible] [illegible] Air Raised to the temperature of 131°.
After [illegible] experiment with this situation, the oxygene consumed was
found to be [illegible] less than [illegible] [illegible] by the same [illegible]
[illegible] [illegible] [illegible] temperature. But he says notwithstan
ding, that the venous blood [illegible] [illegible] of a lighter colour by
[illegible] the heated air. [illegible] [illegible] [illegible] [illegible] the [illegible]
[illegible] [illegible] that the change of arterial into venous
blood [illegible] [illegible] place to the natural extent.
Concerning this experiment I have only to observe, [illegible] the
[illegible] of the Animal [illegible] [illegible] a [illegible], the
[illegible] from the [illegible] [illegible] [illegible] [illegible], [illegible]
sudden and violent, that the [illegible] [illegible] [illegible] [illegible]
[illegible] [illegible] have been [illegible] [illegible] [illegible]
[illegible], and of course that it cannot be considered an
experiment of any bearing on the present inquiry.

food for a long time to
degree. Does the
Germans or English
inconvenience
3216 Cubic inches
in the same season in his own Co
detriment to his system? But may not
in the same ratio? Surely not,
own country
is agreeable to custom
vegetable
Animal.

[illegible] imperfectly known until the [illegible] of modern date discovers the blood [illegible] carbon? [illegible] contains [illegible] degree those qualities [illegible] venous blood, [illegible] to the formation of [illegible].

[illegible] thought that the greater capacity of the veins of the [illegible] sluggish movement of the blood, [illegible] of the blood. But are we to consider the structure [illegible] special [illegible] and the parts to which it [illegible], or that the liver is an organ made to serve the [illegible] of the Porta especially, and the [illegible] circulation [illegible] generally. The latter is the opinion which I am disposed to adopt, assigning to the liver the office of carrying out of the [illegible] of the Porta its excess of carbonaceous matter, and placing [illegible] as an auxiliary to the lungs. [illegible] from [illegible] it has been formed to perform a function similar to that of the lungs. [illegible] it follows that the [illegible] blood [illegible] may be expected [illegible] less dark and [illegible] than that [illegible] Porta circulates [illegible] great proportion [illegible] blood. It collects that which [illegible] lies the very extensive [illegible] made [illegible]

lungs are as it were passive; or to make use of a
the lungs are a fixed quantity, and the ex-
the latter. Now, when we consider how precise the
will contain without offence, and how liable this wonderful
of body, a substance which would permit the escape
valve or tube of safety, which would permit the escape
surplus carbone

[illegible] the same process. [illegible] health and life [illegible] [illegible]
[illegible] [illegible] [illegible] [illegible] [illegible]
[illegible] enabled to perform it to the due extent, [illegible]
[illegible] [illegible] [illegible] for [illegible]
[illegible] [illegible] [illegible], [illegible]
[illegible], as shall [illegible] [illegible] [illegible] of
[illegible] caloric [illegible] [illegible]
[illegible] the liver.

[illegible] [illegible] [illegible]
the liver, [illegible] but [illegible] probability that in the
foetal state, the liver supplies in [illegible] the place of the [illegible]
[illegible] [illegible] [illegible]
[illegible] [illegible] [illegible]
[illegible] [illegible] closely [illegible],
[illegible] chiefly of carbonaceous matter. It is said that
the blood [illegible] the placenta ~~by the umbilical by the~~
[illegible] that in the umbilical arteries.
[illegible] perform the office of lungs.
[illegible] may be but in part executed
[illegible] the lungs [illegible] the liver [illegible], and perhaps the
[illegible] of the [illegible]. [illegible]
by asking the following questions. Why does the liver secrete a
[illegible] matter in the foetus, [illegible]

to the time it had acted,

[illegible] ~~[illegible]~~ causes of bilious affections. —

[illegible]

[illegible] man, [illegible] complexion [illegible]

[illegible] Country. [illegible]

[illegible] climates; but their [illegible]

[illegible] changed to a tawny or brown colour.

[illegible]

[illegible] influence [illegible] at [illegible]

[illegible] black [illegible]. [illegible]

[illegible] toucaling; I am not entirely

[illegible], by the action of the sun [illegible]

[illegible] alter is [illegible],

[illegible]. But it is [illegible] probable that this [illegible]

pigment [illegible] upon the cuticle [illegible].

[illegible]

[illegible], would not be dis=

[illegible]

[illegible] substance

of the [illegible] is much darker than that of the [illegible];

[illegible], being exposed for a little while, to the

[illegible] as the Medulla of the Europeans. Here then

[illegible] cannot act. The disappearance of the

[illegible] to the action of the air, [illegible]

[illegible] the Carbone is the coloring matter

Columns, as appears from the Changes in the Barometer; th
in the density of the air, and cons
in the proportion of Oxygen contained
but. As this variation is not inconsiderable.

a smaller proportion to the Nitrogene

[illegible] pinia, "In that kind [illegible] mind [illegible] sible of any inward expansion in our bodies. [illegible] circulation is languid and seems rather to be oppress[illegible] [illegible] mountains, where [illegible] usually is on the [illegible]"

[illegible] atmosphere occurs such as [illegible] faculty for [illegible] the air only to the degree to which [illegible] lower [illegible] [illegible] rarefied [illegible] phere, [illegible] aceous matter takes pla[illegible]

[illegible] circulation slow and feeble; there [illegible] of bodily strength and vigour; the heat of [illegible] much below the common temperature; [illegible] cold; [illegible] variety of distress and infirmity [illegible] unfortunate Blue Boy is a victim.

[illegible] out of the lungs, - [illegible] says he has frequently [illegible] expectorated in Asthma, of a black colour.

[illegible]

Dr. Morton observed such as labour under [illegible] expectorate a black mucus in the Morning.

[illegible] takes Notice of the same thing.

[illegible] view [illegible] Animous [illegible] disease, [illegible] they throw out the Mucus, [illegible]

[illegible] tions. May this not [illegible]

Before concluding, it is incumbent on me to make some apology for this essay. It may be considered, and I fear with too much reason, not only as novel, but hypothetical, and wildly speculative. I must confess, that at my outset, had I foreseen the frailty of my materials, and the grotesque and unshapely structure I was about to raise, I might have left the work for a future visionary. But I thought I discovered many facts pointing to the deductions I have drawn. I fancied that the subject had truth lurking within it, which might be elicited by the investigation; and in commencing it, I felt like the eager mineral hunter, who had wandered into some wild, and unfrequented spot, and commenced opening a pit: while his only assurance of meeting with the objects of his search he derives from the unexplored, and rugged aspect of the place. Perhaps I may now compare myself to the same mineralogist, who after toiling with his pickaxe and spade, until fatigued, finds himself in possession merely of a few paltry specimens, which he would leave where he found them, were it not for the mortification of returning home without any thing —

Drawing 1813

Resuscitation

1813-
No 44 – No 76

Benedict D Potts.